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Received Nov. 12, 1772.

XX. *A Letter from Patrick Brydone, Esq; to Sir John Pringle, Bart. Pres. R. S. containing an Account of a fiery Meteor, seen on the 10th of February last; and also of some new electrical Experiments. Dated Eccles, (in the Shire of Berwick) 7 July, 1772.*

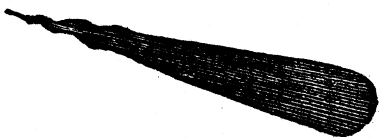
S I R,

Read Feb. 4, 1773. **A**BOUT fourteen years ago, I took the liberty of communicating to you some electrical experiments; which, you thinking worthy of the attention of the Royal Society, were pleased to lay before that respectable body; and those gentlemen did me the honour of publishing them in the first and second part of the fiftieth Volumes of the Philosophical Transactions. Since that time, I have often been engaged in operations of the same kind, some of which, particularly the experiments with the electrical kite, I thought to have troubled you with; but as these were made in foreign countries, and as I was informed that something of the same kind had been done in England, I suspected that you might al-

ready have been acquainted with them; and this consideration prevented me. However, last winter, on my return to this kingdom, I observed some facts in electricity, which I flatter myself you will not think undeserving of your notice. What led me to make these experiments, was the strong electrical appearances that the air exhibited during the last great frost, and the observation of several meteors, and other phænomena, that possibly depend on electrical causes. One of these meteors was so remarkable, that I must beg leave to give you some short account of it.

On Monday the 10th of February last, exactly at seven in the evening, as I was riding through Tweedmouth, a village at the south end of Berwick-bridge, I observed that the atmosphere was suddenly illuminated in a very extraordinary manner. The light of the moon, which was about half full, seemed to be extinguished by the blaze; and I saw my shadow projected on the ground, and almost as distinct, and well-defined, as in sunshine. I turned round to see from whence the light proceeded, when I beheld a long, bright flame, moving almost horizontally along the heavens. It was of a conical form, and from the base to the apex could not be less than six or seven degrees; its height, when I first observed it, seemed to be about fifty degrees; but it descended gently, and appeared to burst about five or six degrees lower. Its course was from north-west to south-east, and seemed to have an inclination to the horizon; but this might be only a deception. The base of the cone was rounded like a sphere; and

and apparently of about one third of the diameter of the moon at her greatest height ; but its light was brighter than that of the planet Venus, and in colour resembled the flame of burning camphire. Near the end of the tail there was a kind of waving motion, which with the whole appearance, I have endeavoured to represent by this figure —



In about ten or twelve seconds it seemed to burst, dividing into a number of small luminous bodies, like the stars in a sky-rocket, which immediately disappeared.

As I had formerly observed explosions from meteors of this kind, I had presence of mind to pull out my watch (which has a second hand) to measure the exact time the report should take in reaching me. I waited for upwards of four minutes, which in my state of expectation appeared a much longer time ; when, despairing of any report, I rode on, but had not got to the middle of the bridge, when I was stunned by a loud and heavy explosion, resembling the discharge of a large mortar, at no great distance, and followed by a kind of rumbling noise, like that of thunder. I examined my watch, and found, that the sound had taken five minutes, and about seven seconds, to reach me ; which, according to the common computation of 1142 feet in a second, amounts to the distance of at least 66 miles. It did not occur to me to measure the duration of the light,

which probably did not exceed ten or twelve seconds; and during this short period, the length of the path, the meteor seemed to describe, could not be less than 30 degrees. I expected to have seen some account of this phenomenon from Newcastle, as, by its direction and distance, I imagined it had burst pretty near to the zenith of that city; but I have found no notice taken of it in the news-papers there. About a week after, I mentioned what I had seen to Sir John Paterfon, of Eccles, who told me he was at that time on the road, betwixt Greenlaw and his own house, in company with Mr. Thomas Cockburn, of Edinburgh; and, as they were riding to the south, they observed the meteor from its first appearance, which was about three or four seconds sooner than I had time to turn about and view it; and this, perhaps, is the reason that it appeared so much higher to them than it did to me. These gentlemen observed, that when it first became luminous, it was almost vertical, but went off descending to the south-east, and had in other respects the appearance I have described. They added, that some considerable time after the light disappeared, they heard a great report, which they took for a clap of thunder; for the interval was so long, that they did not imagine this sound had any connection with what they had seen.

Now, as these gentlemen were at least 20 miles to the west of the spot where I made my observation, and as the appearance and height of this meteor seems to have been nearly the same to them as to me, it is probable that it was at a very  
great

great distance from the earth, and much beyond the limits that have been assigned to our atmosphere. The smaller meteors, which we call falling stars, I have frequently observed from the mountain of St. Bernard, one of the high Alps; and last year I had the good fortune to see several of them from the highest region of Mount Etna; an elevation still more considerable, and probably the greatest accessible one in Europe, and they always appeared as high, as when seen from the lowest grounds; so that probably the height of two or three miles, bears but a small proportion to the common altitude of these bodies.

From their frequent appearance, during the last frost, I was inclined to believe, that the air was then in a very favourable state for electrical purposes; but not being provided with a common machine, I bethought me of a whimsical one to supply the want of it. The back of a cat, it is well known, often exhibits strong marks of electricity; being, therefore, desirous to try what effect this might produce, when made use of instead of the glass globe, I cut a quantity of harpsichord-wire into short pieces, of five or six inches, and tying them together at one end, made the other diverge like the hair of a brush. I took a large metal pestle of a mortar for my conductor, to the end of which I fixed the brush of wire; and insulated the whole, by placing it on a couple of wine-glasses. I then took a cat on my knee, and bringing her back under the wires, I began to stroak it gently. The animal continued in good humour for a few minutes, and I had the satisfaction

faction to see that the conductor was so much charged, that it emitted sparks of a considerable force, and attracted strongly such light bodies as were brought near it; but the cat at last becoming uneasy, threatned to put an end to our experiment. The passage of the electrical fire, from the hair of her back to the small wires, occasioned, it seems, a disagreeable sensation, which she could not bear; so that turning about her head to defend her back, the tip of her ear happening to touch the conductor, and a large spark coming from it, she sprung away in a fright, and would not allow me to come near her more. However, after a long interval, the animal seeming to have forgotten her adventure, a young lady in company, less obnoxious to her than I was, undertook to manage her. Having first covered the back of this lady's hand with a piece of dry silk, that none of the electric fire communicated to the wires might be lost, she then began to stroke the cat as I had done, and the conductor soon after appeared fully charged: we drew large sparks from it, and if the animal would have continued quiet, I have no doubt that we should have shewn many of the common experiments in electricity; but she soon became so outrageous, that we were glad to put an end to our operations, without any hopes of being able to repeat them, at least with the same instrument. In this dilemma I recollected, that a lady had told me, that on combing her hair, in frosty weather, she had often been sensible of a little crackling noise; and in the dark had sometimes observed small sparks of fire to issue from it. I proposed, therefore,

therefore, that one of the young ladies would suffer the experiment to be made upon her head, which she agreed to. The conductor was then insulated as before, and the lady having placed herself so, that the back part of her head almost touched the brush of wire, I desired her sister to stand behind her, on a cake of bees-wax; who, as soon as she began to comb the hair of the former, the conductor emitted sparks still of a larger size than those we had hitherto seen. The hair was extremely electric, and when the room was darkened, we could perceive the fire pass from it along the small wires to the conductor. The young lady who was on the wax, was not a little surprized to find, that the moment she began to comb her sister's hair, her own body became electric, darting out sparks of fire against every substance that approached her. We found, however, that these sparks were not strong enough to fire spirits. I then coated a small phial, and soon charged it from the conductor; but afterwards I did it more compleatly from the hair itself in the following manner. I fixed a brush of small wires to the large one that went through the cork of the phial; and taking the phial in my hand, I followed every motion of the comb with the brush of wires; and, in the dark, could observe the fire pass by these wires into the bottle. In a few minutes I found it was highly charged; when taking a spoonful of warm spirits in my left hand, and with my right, which grasped the phial, bringing the hook of the great wire near the surface of the spirits, a large spark darted from it,

gave



gave me a smart shock, and at the same time set the spirits on fire.

The day following, we wanted to repeat our experiments; but as the weather was hazy, and the frost had greatly abated, they did not so well answer. However, from making them on several heads, we found that the stronger the hair, the greater was the effect; whereas, soft flaxen hair produced little or no fire at all.

It may not be improper to mention, that these experiments were made in a warm, dry room, before a good fire, and at a time when the thermometer, in the open air, was at six or seven degrees below the point of congelation. The hair, which succeeded best, was perfectly dry, and no powder or pomatum had been used on it for some months before.

I have the honour to be,

S I R,

Your most obedient,

and most humble servant.

Patrick Brydone.